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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/611,461

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Steve Longerbeam

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05/15/2006

FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER
LLP

901 NEW YORK AVENUE, NW
WASHINGTON, DC 20001-4413

EXAMINER

PATEL, KAUSHIKKUMAR M

ART UNIT

PAPER NUMBER

2188

DATE MAILED: 05/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/611,461	Applicant(s) LONGERBEAM ET AL.	
	Examiner Kaushikkumar Patel	Art Unit 2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to applicant's communication filed March 8, 2006 in response to PTO office action mailed October 31, 2005. The applicant's remarks and amendments to the claims were considered with the results that follow.
2. In response to the last office action, claims 1, 6-7, 9-11, 13-14, and 17-18 have been amended. No claims have been added or canceled. As a result, claims 1-21 remain pending in this application.

Response to Arguments

3. Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new grounds of rejection.
4. Applicant argues that Sullivan (Using Write Protected Data structures To Improve Software Fault Tolerance in Highly Available Database Management Systems (DBMS)) is from completely different field of technology. Examiner respectfully disagrees with this. As Sullivan teaches DBMS to guard (write-protect) the data structure (see abstract). Sullivan also cites using Sprite operating system to protect the data structures from accidental updates by incorrect software (see page 172, column 1, lines 9-20). According to definitions from Microsoft Computer Dictionary (fifth edition), database is a file composed of records, so database management is inherently interpreted as file system management (which is same technology field as present application). Also Sullivan teaches protecting the database structure (file system structure) from

Art Unit: 2188

accidental (errant) updates by incorrect software (operating system or kernel). (Which applicant is claiming in the field of present application).

Claim Objections

5. Claims 1-4, 8-9, 11-13, 16 and 20 objected to because of the following informalities:

6. As per claim 1, line 3 cites "page table entry", line 8 cites "write access" and line 9 cites "the page table entries". These subjects are open to interpretation as lacking antecedent basis.

As per claim 2, line 2 cites "the memory". This subject is open to interpretation as lacking antecedent basis.

As per claim 3, line 2 cites "page table entries". This subject is open to interpretation as lacking antecedent basis.

As per claim 4, line 2 cites "a read/write flag". This subject is open to interpretation as lacking antecedent basis.

As per claim 8, line 1 cites "the each page table entry". This subject is open to interpretation as lacking antecedent basis.

As per claim 9, line 2 cites "the read/write flag". This subject is open to interpretation as lacking antecedent basis.

As per claims 11 and 13, lines 5 and 4 cite "read-write flag". This term is not consistence with other claims. Please replace with "read/write flag".

As per claims 12-13 line 1 cites "the method". Examiner recommends replacing the above with "the computer-implemented method".

As per claim 13, line 3 cites "page table entries"; line 4 cites "a read-write flag", line 6, cites "a write operation". These subjects are open to interpretation as lacking antecedent basis.

As per claim 16, line 3 cites "a read/write flag". This subject is open to interpretation as lacking antecedent basis.

As per claim 20, line 2 cites "a read/write flag". This subject is open to interpretation as lacking antecedent basis.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sullivan et al. (Using Write Protected Data structures To Improve Software Fault Tolerance in Highly Available Database Management Systems (DBMS)) (Sullivan herein after) (and Tyler et al. 5,699,551 introduced as evidentiary reference).

As per claim Sullivan teaches a computing system comprising:

at least one random access memory (RAM), the RAM having a storage location containing file system data with associated page table entries {Sullivan teaches a

Art Unit: 2188

DBMS operating under Sprite operating system and data is loaded in the buffer [RAM is known to used for buffer] (see abstract and page 172, column 1, paragraph 2 and page 173, column 1, paragraph 2 teaches processor implementing translation lookaside buffer (TLB)). It well known in the art that operating system mounts data in buffer (RAM) in order to access the data and translation lookaside buffer is one kind of page table, thus Sullivan inherently teaches RAM with file system data and page table entries}, each page table entry having read/write flag for the file system data (page tables with read/write flags are well known in the art), the file system data being initially mapped for read-only access (Sullivan teaches initially guarding (write-protecting) the database with hardware level (see page 173, section 3.1) using page tables (and TLB), page 173, column 1, paragraph 6); and a processor configured to remap the file system data from write access by modifying the read/write flag of the page table entries, to perform a write operation on the file system data during write access, and to remap the file system data back for read-only access by modifying the read/write flag of the page table entries (page 173, column 1, paragraph 2, teaches that "the guarding implementation assumes that the processor has a software-loaded TLB and the guard/unguard operations can be performed by modifying TLB, page 173, column 1, paragraph 6). Sullivan teaches a guard (write-protect) and unguard (write enable) functions to protect the database structure from errant write. Sullivan initially write-protects data in hardware at page granularity, and unguards the page when data needs to be updated and then regards back to write-protection level using TLB. See page 173, column 1. Sullivan further provides motivation to use page table entry remapping on page 179, column 1, section

8, and paragraph 2. (Tyler et al. 5,699,551 teach that computer system use virtual memory to provide protection and virtual memories also uses page tables and read/write flags (column 1, lines 27-29, and lines 45-54)). It would have been obvious to one having ordinary skill in the art at the time of the invention to use Sullivan's guard/unguard protection of database to use page table remapping as suggested by Sullivan (page 179, section 8) to protect file system from errant writes from corrupted software (operating system kernel).

As per claim 2, mounting the file system is well known in the art to make the file system accessible (Microsoft Computer Dictionary fifth edition).

As per claim 3-4, Sullivan teaches using TLB (hence page table) to guard/unguard and then reguard the data that needs to be updated as per claim 1.

As per claim 5, Sullivan teaches protected database system (which is one kind of files tem). It would have been obvious to one having ordinary skill in the art at the time of the invention to use Sullivan's guard/unguard method to protect Linux file system.

As per claim 6, Sullivan teaches file system (DBMS system) to protect data structure from errant writes (abstract) by modifying at least one page table entry (page 173, column 2, paragraph 6 and page 179, column 1, paragraph 5) associated with the file system data to write enable mode during write operation on the file system and to read-enable mode after the write operation on the file system data [Sullivan initially write-protects (read-only mode) (guard) data in hardware at page level and during updating of data, unprotects (changing it to write enable mode) the page and then regaurds back to read-only mode after updating the database, this inherently teaches

changing from read-enable mode to write-enable and back to read-enable mode).

Sullivan fails to teach mounting file system in the RAM. Mounting file system in the RAM is well known in the art (article by Mark Nielsen, How to use a Ramdisk for Linux is introduced as an evidence, in which Mark Nielsen teaches mounting Linux file system on Ramdisk). It would have been obvious to one having ordinary skill in the art at the time of the invention to mount file system on Ramdisk as taught by Mark Nielsen in DBMS system of Sullivan to increase system performance and file system mounted in Ramdisk eliminates the use of disk cache (see page of Mark Nielsen).

As per claims 7 and 8, use of super block, an inode table, in-use bitmap and a data block section and page tables with read/write flag is well known in the art and examiner takes official notice of that.

As per claims 9 and 10, Sullivan teaches changing page table entries inherently teaches changing read/write flags associated with the page table entries.

Claims 11-13 are also rejected under same rationales as applied to claims 1-10 above.

As per claims 14-21, Sullivan teaches protecting file system (database system) using guard/unguard system calls to remap page table entries as explained in claims 1-10 above but fails to teach disabling context switching and interrupts. It is well known in the art that writing a page which is write-protected by setting read/write flag of page table generates an interrupt (see Taylor et al. column 14, lines 65-67). It would have been obvious to one having ordinary skill in the art to disable interrupts and context switching to allow modification of page table entries.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaushikkumar Patel whose telephone number is 571-272-5536. The examiner can normally be reached on 8.00 am - 4.30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


kmp

Kaushikkumar Patel
Examiner
Art Unit 2188


MANO PADMANABHAN
SUPERVISORY PATENT EXAMINER
5/12/06